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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY/US

Int'l Application of:
The Trustees of Tufts College

Authorized Officer: Kaushal, S.

Int'l Appl. No.: PCT/US99/13024

Attorney Docket No.: 8471-007-228

Int'l Filing Date: June 11,1999

For: GENE AND PROTEIN SEQUENCES OF PHAGE T4 GENE 35

REPLY TO WRITTEN OPINION

Assistant Commissioner for Patents
BOX PCT
Washington, D.C. 20231

Sir :

In response to the Written Opinion issued by the International Preliminary Examining Authority on June 28, 2001 concerning the above-identified application, and in accordance with Rules 66.2(c) and 66.3(a) of the Regulations under the Patent Cooperation Treaty, please consider the amendments and remarks below.

AMENDMENTS

Original claims 5 and 6 have been canceled without prejudice. Original claims 7-48 have been renumbered as claims 5-46, respectively, including corresponding changes in references to base claims present in dependent claims. Original claims 3, 4, 7, 11, and 20-23 have been amended as described below. Exhibit A, substitute pages 45-49, containing the new and amended claims, are submitted to replace current pages 45-50.

REMARKS

Claims 1-48 are presently pending. In response to the Written Opinion issued by the International Preliminary Examination Authority dated June 28, 2001, Applicants acknowledge the Authorized Officer's indication that claims 1-4 and 7-48 meet the criteria for

novelty and inventive step over the art, and that claims 1-48 meet the criteria for industrial applicability, under PCT Article 33(2) - (4).

Further in response to the Written Opinion, Applicants have canceled original claims 5 and 6 without prejudice, and amended original claim 11 in order to change its dependency. Original claims 7-48 have been renumbered as claims 5-46, respectively, including corresponding changes in references to base claims present in dependent claims.

Original claim 11 (now claim 9), which previously depended from canceled original claim 6, has been amended to depend from claim 4. Support for the amendment to claim 9 is found, *inter alia*, at page 4, lines 14-20; page 7, lines 20-21; page 8, lines 1-3 and 11-13; and page 9, lines 13-15.

Original claims 3, 4 and 7 (now claims 3-5) have been amended to recite that the purified protein is not contained in a gel. Support for these amendments may be found, *inter alia*, at page 6, lines 4-6, of the specification.

Original claim 20 (now claim 18) has been amended to recite that the purified molecule is not contained in a gel. Support for these amendments may be found, *inter alia*, at page 6, lines 4-6, of the specification.

Original claims 21-23 (now claims 19-21) have been amended to recite that the purified protein is not contained in a gel. Support for these amendments may be found, *inter alia*, at page 6, lines 4-6, of the specification.

Replacement sheets 45-49, attached as Exhibit A, are submitted to replace current pages 45-50.

The amendments to the claims do not entail the introduction of new matter. Reconsideration of the application in light of the above amendments and the following Remarks is respectfully requested.

CLAIM 5

The Authorized Officer states that claim 5 lacks novelty as being anticipated by Goldberg (WO96/11947, 1996) (Written Opinion, Section V.2). Claim 5 has been canceled without prejudice, rendering the Authorized Officer's rejection moot.

CLAIM 6

The Authorized Officer states that claim 6 lacks novelty as being anticipated by Oliver (J. Mol. Biol. 153:545-568, 1981) (Written Opinion, Section V.2). Claim 6 has been canceled without prejudice, rendering the Authorized Officer's rejection moot.

THE DESCRIPTION

The description is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 5 because the Authorized Officer alleges that "the description is inadequate because [it] describes only the sequences SEQ ID No. 1 and SEQ ID No. 2 which encodes [sic] a bacteriophage T4 gp35 protein, wherein the invention as claimed encompasses any and all gp35-like proteins encoded by any and all variant[s] of SEQ ID NO:1 and 2," and that "[t]he two sequences described do not reflect the genus of the purified proteins as claimed" (Written Opinion, Section VIII, emphasis added). Applicants respectfully disagree. The description fully enables the claimed genera and variants of gp35 and gp 35-like proteins.

CONCLUSION

For the foregoing reasons, Applicants believe that the claims as amended meet all the criteria set out in PCT Article 33(3), and respectfully request withdrawal of the negative statements regarding novelty, inventive step, and written description in the Written Opinion.

If any fees are due in connection with this submission, please charge the required fee to Pennie & Edmonds LLP Deposit Account No. 16-1150. A copy of this sheet is enclosed.

Respectfully submitted,

Date July 30, 2001

Adriane M. Antler 32,605

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Attachments:
Exhibit A: Replacement sheets 45-49 for original pages 45-50

EXHIBIT A

PCT/US99/13024
(Attorney Docket No. 8471-007-228)

REPLACEMENT SHEETS 45-49 FOR ORIGINAL PAGES 45-50

WHAT IS CLAIMED IS:

1. A composition comprising at least 1 microgram of a purified nondenatured gp35 protein, with the proviso that said composition is not a gel.

2. A purified bacteriophage T4 gp35 protein that is not contained in a gel.

3. A purified protein comprising the amino acid sequence depicted in Figure 2 (SEQ ID NO:2) with one or more conservative substitutions relative to said sequence, wherein the purified protein is not contained in a gel.

4. A purified protein comprising an amino acid sequence of 100 amino acids that has at least 60% identity to a gp35 protein having the amino acid sequence depicted in Figure 2 (SEQ ID NO:2), wherein the purified protein is not contained in a gel.

5. A purified protein comprising at least 8 contiguous amino acids of the gp35 protein sequence depicted in Figure 2 (SEQ ID NO:2) from amino acids numbers 1 to 24, and which displays one or more functional activities of a gp35 protein, wherein the purified protein is not contained in a gel.

6. The protein of claim 5 which is able to be bound by an antibody directed against a gp35 protein.

7. The protein of claim 5 which has only conservative substitutions relative to the sequence in Figure 2 (SEQ ID NO:2).

8. A molecule comprising the protein of claim 5.

9. The protein of claim 4 which specifically binds with the P34 protein oligomer of bacteriophage T4.

10. A purified fragment of the protein of claim 4, which comprises at least 8 contiguous amino acids of the gp35 protein sequence depicted in Figure 2 (SEQ ID NO:2)

from amino acids numbers 1 to 24, and which displays one or more functional activities of a gp35 protein.

11. The fragment of claim 10 which is able to be bound by an antibody directed against a gp35 protein.

12. A purified protein variant of a gp35 protein of bacteriophage T4, that is able to be bound by an antibody directed against a gp35 protein, wherein the interaction of said variant with the P36 protein oligomer of bacteriophage T4 is unstable at temperatures between about 40°C and about 60°C.

13. A purified protein variant of a gp35 protein of bacteriophage T4, that is able to be bound by an antibody directed against a gp35 protein, wherein the interaction of said variant with the P34 protein oligomer of bacteriophage T4 is unstable at temperatures between about 40°C and about 60°C.

14. A purified protein variant of a gp35 protein of bacteriophage T4, that (a) is able to be bound by an antibody directed against a gp35 protein, and (b) is conjugated to a group that confers the ability of the variant to bind a ligand.

15. The variant of claim 14, wherein said ligand is selected from the group consisting of avidin, immunoglobulin, and a divalent metal ion.

16. A purified molecule comprising a bacteriophage T4 gp35 protein fragment, wherein said fragment consists of at least the amino acid sequence depicted in Figure 2 (SEQ ID NO:2) from amino acids numbers 1-17, 1-56, 1-78, 1-93, 8-17, 57-93, 57-64, 66-79 or 81-93.

17. A purified molecule comprising the amino acid sequence depicted in Figure 2 (SEQ ID NO:2) from amino acids numbers 1-17, 1-56, 1-78, 1-93, 8-17, 57-93, 57-64, 66-79 or 81-93, with one or more conservative substitutions relative to said sequence.

18. A purified molecule comprising an amino acid sequence having at least 30% identity to amino acids numbers 57 to 93 in Figure 2 (SEQ ID NO:2) over a 36 amino acid sequence, wherein the purified molecule is not contained in a gel.

19. A purified protein having at least 60% identity to amino acids numbers 57 to 93 in Figure 2 (SEQ ID NO:2) over a 36 amino acid sequence, wherein the purified protein is not contained in a gel.

20. A purified protein comprising at least a functionally active portion of the amino acid sequence in Figure 2 (SEQ ID NO:2) from amino acids numbers 1-17, 1-56, 1-78, 1-93, 8-17, 57-64, 66-79, or 81-93, wherein the purified protein is not contained in a gel.

21. A purified molecule comprising an amino acid sequence having at least 60% identity to amino acids numbers 1 to 100 in Figure 2 (SEQ ID NO:2) over a 100 amino acid sequence, wherein the purified protein is not contained in a gel.

22. The purified fragment of claim 5, wherein said fragment lacks at least 10 contiguous amino acids of the sequence depicted in Figure 2 (SEQ ID NO:2).

23. A purified nucleic acid, comprising a nucleotide sequence encoding a gp35 protein having the amino acid sequence depicted in Figure 2 (SEQ ID NO: 2), operably linked to a heterologous promoter that controls expression of the nucleotide sequence.

24. A purified nucleic acid, comprising a nucleotide sequence encoding a gp35 protein having the amino acid sequence depicted in Figure 2 (SEQ ID NO: 2), contiguous with a sequence of at least 10 nucleotides that is not of bacteriophage T4.

25. The purified nucleic acid of claim 23, further comprising nucleotide sequences encoding gp36, gp37 and gp57 proteins, respectively, operably linked to said promoter.

26. The purified nucleic acid of claim 23, in which the nucleic acid is DNA.

27. The purified nucleic acid of claim 23, in which the nucleic acid is RNA.

28. A purified nucleic acid comprising a nucleotide sequence absolutely complementary to a nucleotide sequence encoding a gp35 protein having the amino acid sequence depicted in Figure 2 (SEQ ID NO:2), contiguous with a sequence of at least 10 nucleotides that is not of bacteriophage T4.

29. A purified nucleic acid comprising at least 850 contiguous nucleotides of a *gp35* DNA sequence, with the proviso that the nucleic acid does not contain a bacteriophage T4 promoter.

30. A purified nucleic acid, comprising a nucleotide sequence encoding a gp35 protein consisting of at least the amino acid sequence shown in Figure 2 from amino acids numbers 1-17, 1-56, 1-78, 1-93, 8-17, 57-93, 57-64, 66-79, or 81-93.

31. A purified nucleic acid comprising a nucleotide sequence encoding a protein consisting of at least the amino acid sequence shown in Figure 2 (SEQ ID NO:2) from amino acids numbers 1-17, 1-56, 1-78, 1-93, 8-17, 57-93, 57-64, 66-79 or 81-93, with one or more conservative substitutions relative to said sequence.

32. A purified nucleic acid, comprising the nucleotide sequence depicted in Figure 2 (SEQ ID NO:1) from nucleotide numbers 1 to 1,116, wherein said sequence is contiguous to a 3′ termination codon.

33. A purified nucleic acid, comprising a nucleotide sequence encoding a protein having at least 30% identity to amino acids numbers 57 to 93 in Figure 2 (SEQ ID NO:2) over a 36 amino acid sequence.

34. A purified nucleic acid, comprising a nucleotide sequence encoding a protein containing at least a functionally active portion of the amino acid sequence in Figure 2 from amino acids numbers 1-17, 1-56, 1-78, 1-93, 8-17, 57-64, 66-79, or 81-93.

35. A purified nucleic acid, comprising a nucleotide sequence encoding the protein of claim 10.

36. The purified nucleic acid of claim 35, wherein said protein is missing at least 10 contiguous amino acids of the sequence depicted in Figure 2 (SEQ ID NO:2).

37. A nucleic acid vector comprising the nucleic acid of claim 24 or 31.

38. An expression vector comprising the nucleic acid of claim 31 operably linked to a heterologous promoter that controls expression of the nucleotide sequence in a host cell.

39. A host cell that contains the nucleic acid of claim 23.

40. A host cell that contains the nucleic acid of claim 31.

41. A host cell that contains the nucleic acid of claim 31 operably linked to a heterologous promoter that controls expression of the nucleotide sequence in the host cell.

42. A method of producing a protein comprising growing the host cell of claim 39 such that the gp35 protein is expressed by the cell, and recovering the expressed protein.

43. A method of producing a protein comprising growing the host cell of claim 41 such that the encoded protein is expressed by the cell, and recovering the expressed protein.

44. The product of the method of claim 42.

45. The product of the method of claim 43.

46. A kit comprising in one or more containers a pair of nucleic acid primers capable of priming amplification of at least a portion of a gp35 gene, in which the 5′ primer is upstream of or comprising a sequence encoding the N-terminus of a gp35 protein.